On the mean past lifetime of the components of a parallel system

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In the study of reliability of the technical systems parallel systems play an important role. In this talk we consider a parallel system consisting n identical components with independent lifetimes having a common distribution function F.It is known, on the basis of the structure of parallel systems, that when the components of the system fail the system is continuing to work until a component with maximum lifetime fails. In fact, the system can be considered as a black box in the sense that the exact failure time of components are unknown. Motivated by this, we assume that at time t the system is not working and has failed at time t or sometime before time t. Under these conditions, we rise the following question: How long ago, in average, does the rth component of the system has failed, r=1,...,n? To answer this, we define the mean past lifetime (MPL) of the components of the system. Some properties of the proposed MPL will be addressed. For example, we will show that the underlying distribution function F can be recovered by MPL. We also obtain an upper bound for MPL. Comparison between two parallel systems on the basis of their MPL's would be discussed. The behaviour of MPL of a parallel sytem with exponential components is studied. Finally a characterization of uniform distribution is given based on MPL.